

The Economic Role of the Entrepreneur

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Abstract

Entrepreneurs play a central role in the economy by establishing firms, which in turn create markets and organizations. The paper presents a dynamic theory of the entrepreneur. An individual engages in entrepreneurial activities before the firm is established and then becomes an owner after the firm is established. I refer to the change in the individual's role from entrepreneur to owner as the foundational shift. Before the foundational shift occurs, the objectives of the startup enterprise cannot be separated from those of the entrepreneur. After the firm is established, by definition, its objectives are separate from those of its owners. The foundational shift is important because it helps to explain the interconnections between the financial, labor and technology decisions of the startup enterprise and the consumption, human capital, and innovation decisions of the individual entrepreneur. The entrepreneur faces three types of competition. In type-I competition, the entrepreneur competes with other entrepreneurs to establish the most efficient new firm. In type-II competition, the entrepreneur competes with direct exchange between consumers; the newly-established firm must create efficiencies of exchange that consumers cannot achieve on their own. In type-III competition, the entrepreneur competes with existing; the newly established firm must offer innovations and efficiencies that cannot be achieved by adjusting or expanding incumbent firms.

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Introduction

Entrepreneurs are major contributors to economic growth, development, and prosperity; see Schramm (2006a) and Baumol, Litan, Schramm (2007). Entrepreneurs are responsible for a large share of technological innovation in products and production processes, driving economic transformation and international trade. Entrepreneurs establish new forms of organizations and employ new types of business methods. Economic theory must keep up with these critical developments by understanding the fundamental contributions of entrepreneurs. Such an understanding is essential for formulating economic policies that do not restrict productive entrepreneurs. Yet, despite the essential nature of their economic contribution, the importance of entrepreneurs has not been recognized fully in neoclassical economics. In this paper, I propose an economic framework for understanding the economic contribution of the entrepreneur.

Entrepreneurs play a central role in the modern economy because they are the prime movers – the makers of firms. Entrepreneurs are fundamental to economic equilibrium because they set the economy in motion. Firms are responsible for practically all economic activity outside of government: innovating, pricing, contracting, employing resources, labor, and capital goods, raising financial capital, organizing production, and marketing goods and services. In equilibrium, firms create markets as well as organizations, making both types of institutions endogenous. Economic equilibrium, including prices, allocation of goods, and the structure of transactions, thus depends on the actions of entrepreneurs. The discussion draws upon the microeconomic analysis in

Spulber (2008) in which not only entrepreneurs, but also firms, markets, and organizations are endogenous.

Yet, as individuals, entrepreneurs are distinct from firms. I present a dynamic theory of the entrepreneur. An individual engages in entrepreneurial activities before the firm is established and then becomes an owner after the firm is established. I refer to the change in the individual's role from entrepreneur to owner as the foundational shift. Before the foundational shift occurs, the objectives of the startup enterprise cannot be separated from those of the entrepreneur. Individuals choose to become entrepreneurs based on the personal rewards offered by market opportunities and generated by their capabilities. After the firm is established, by definition, its objectives are separate from those of its owners. The foundational shift is important because it helps to explain the interconnections between the financial, labor and technology decisions of the startup enterprise and the consumption, human capital, and innovation decisions of the individual entrepreneur.

Based on the model of the entrepreneur, I consider the three main types of competition faced by entrepreneurs. In type-I competition, entrepreneurs compete with each other to establish firms. The many personal attributes of entrepreneurs that are critical include preferences, income, wealth, judgment, knowledge, ability, ideas, and opportunity costs. In type-II competition, entrepreneurs compete with direct exchange between consumers. Entrepreneurs will be successful in establishing firms only if firms provide transaction benefits that cannot be achieved by consumer organizations. In type-III competition, entrepreneurs compete with established firms since the entrepreneurial start-up must provide incremental economic benefits that incumbents are unable or

unwilling to provide. To add value, the entrepreneur must launch a firm that can offer scarce capacity, more effective organizations, better market transactions, more efficient technologies, or differentiated goods and services.

The general theory of the firm presented here contrasts substantially with neoclassical economics.¹ In neoclassical general equilibrium theory, firms and markets are given exogenously. Firms are described by the production technology. Markets are given for practically every good, location, time and state of the world, and operate costlessly. Organizations are missing from the neoclassical framework. Most significantly, because firms are givens, the entrepreneur has no economic function. As William Baumol (2006) observes, the entrepreneur is mentioned virtually never in the modern theory of the firm and observes that “The more critical explanation of the absence of the entrepreneur is that in mainstream economics the theory is generally composed of equilibrium models in which, structurally, nothing is changing. But, this

¹ The entrepreneur has played practically no part in neoclassical economics for two main reasons. First, firms already are given exogenously, so no entrepreneur is needed to establish them. Second, entrepreneurs play little part in neoclassical economics since markets already exist in standard models. Moreover, markets attain an equilibrium by means of the invisible auctioneer, so that firms are not needed to create or manage markets. Neoclassical economics is silent on entrepreneurs because they serve no purpose since firms are confined to production. When firms make markets, entrepreneurs are needed to provide the market-making mechanism.

excludes the entrepreneur by definition,” see also Baumol (1993). The entrepreneur also tends to be absent from economics courses.²

Despite their absence from current microeconomic theory, entrepreneurs have been discussed by economists since the dawn of the field of economics. Richard Cantillon introduced the entrepreneur in 1732 in his path-breaking economic treatise. The theory of the entrepreneur has undergone cycles of revival and neglect throughout the history of economic thought. Jean-Baptiste Say (1841, 1852) provides the first comprehensive discussion of the entrepreneur in economic analysis, emphasizing the effects of the entrepreneur’s reputation, judgment, and risk bearing on profit. Entrepreneurs are central to Frank Knight’s (1971) discussion of risk, uncertainty, and profit. Knight emphasizes both the supply of and demand for entrepreneurship. Joseph Schumpeter (1934, p. 75) identifies entrepreneurship as “the fundamental phenomenon of economic development. The carrying out of new combinations we call ‘enterprise’; the individuals whose function it is to carry them out we call ‘entrepreneurs.’” Schumpeter (1934, p. 66) further observes that “new combinations are, as a rule, embodied, as it were, in new firms which generally do not arise out of the old ones but start producing beside them.”

² Dan Johansson (2004) studies Ph.D. programs and textbooks in economics and finds that required Ph.D. courses in microeconomics, macroeconomics, and industrial organization and the related textbooks completely exclude the concept of the entrepreneur. Johansson concludes that “there is a need for economics Ph.D. training based on theories that incorporate entrepreneurship and institutions.”

These classical themes are developed further in the modern literature on the entrepreneur. Mark Casson's (1982, p. 23) discussion emphasizes intermediation by entrepreneurs: "an entrepreneur is someone who specializes in taking judgmental decisions about the coordination of scarce resources," see also Casson (2003). Casson (1982, 2003) describes the entrepreneur as a coordinator and middleman. Casson (1982, p. 84) argues that the firm provides market-making activities to address each of these: contact making via search or advertising, specification and communication of the trade to each party, negotiation, transport and administration, monitoring of quality, and enforcement. Casson (1982, chapter 9) concludes that the entrepreneur "specializes in providing market-making services." The entrepreneur builds the firm as a "market-making organization" to reduce the transaction costs of intermediation.³ Thomas Hellmann (2007) models the entrepreneur as an intermediary in the market for inputs needed to establish a firm and shows how the entrepreneur convinces suppliers of complementary resources to commit to the new venture.

³ Casson (1982, p. 84) identifies various obstacles to trade including no contact between buyer and seller, no knowledge of reciprocal wants, no agreement over price, need to exchange goods and pay taxes, no confidence in product descriptions, and no confidence that restitution will be made for default. Casson (1982, p. 97) points out that "For information flows as complex as those required for the operation of a market, social convention is usually unable to provide the degree of structure required. Greater sophistication is called for and this necessitates the use of purpose-built organizations. Among these purpose-built organizations are market-making firms."

Baumol (1968) emphasizes the function of the entrepreneur as locating new ideas, putting them into effect, and exercising leadership. Baumol (2006) argues that the innovative entrepreneur relies on price discrimination to raise funds for innovation.

Baumol (1993) presents theoretical models that examine the innovative activities of the entrepreneur, see also Baumol (2002, 2006). Baumol (1993) contrasts innovations that are substitutes from those that are complements, and shows how incentives can differ for firms engaged in complementary innovation.

The paper is organized as follows. Section 1 considers the economic role of the entrepreneur in the general theory of the firm as set forth in Spulber (2008). Section 2 presents a dynamic theory of the entrepreneur and introduces the concept of the foundational shift. Sections 3, 4, and 5 examine the three types of competition that entrepreneurs encounter. Section 6 concludes the discussion.

1. The Economic Role of the Entrepreneur

An entrepreneur is an individual who establishes a firm. Because of their importance in the modern economy, entrepreneurs should be at the heart of microeconomics. Entrepreneurs set up firms in response to economic incentives. In turn, firms create and operate markets that provide mechanisms of exchange for consumers. Firms also create and manage organizations that provide internal coordination and market interactions. The actions of entrepreneurs are the essential force that helps to drive the economy towards equilibrium. This process is illustrated in Figure 1.

Entrepreneurs are endogenous to the economy in the general theory of the firm. The entrepreneur is, before anything, a consumer. The consumer becomes an

entrepreneur by choosing to establish a firm. Consumers bring to the task of entrepreneurship their judgment, knowledge, and technology. Consumers decide to become entrepreneurs based on their personal characteristics and their judgment of available market opportunities. Entrepreneurs act rationally and purposefully based on maximizing their net benefits.⁴

A firm is defined to be a transaction institution whose objectives are separate from those of its owners. All firms involve some combination of market mechanisms and organizational structures. A market is a transaction mechanism that brings buyers and sellers together. A market can be a store, a web site, a matchmaker, or an auction. An organization is a mechanism for managing nonmarket transactions inside the firm, including those between owners and managers, between managers and employees, and between employees, and for managing the firm's market transactions. An organization can involve hierarchies, bureaucracies, groups, teams, and networks.

⁴ Ludwig von Mises (1998, p. 255), in his classic analysis of human action, states that in the context of economic theory, "Entrepreneur means acting man in regard to the changes occurring in the data of the market."⁴ For von Mises (1998, p. 259), "The market process is entirely a resultant of human action." He (1998, p. 312) observes that "The market is a social body; it is the foremost social body. The market phenomena are social phenomena."

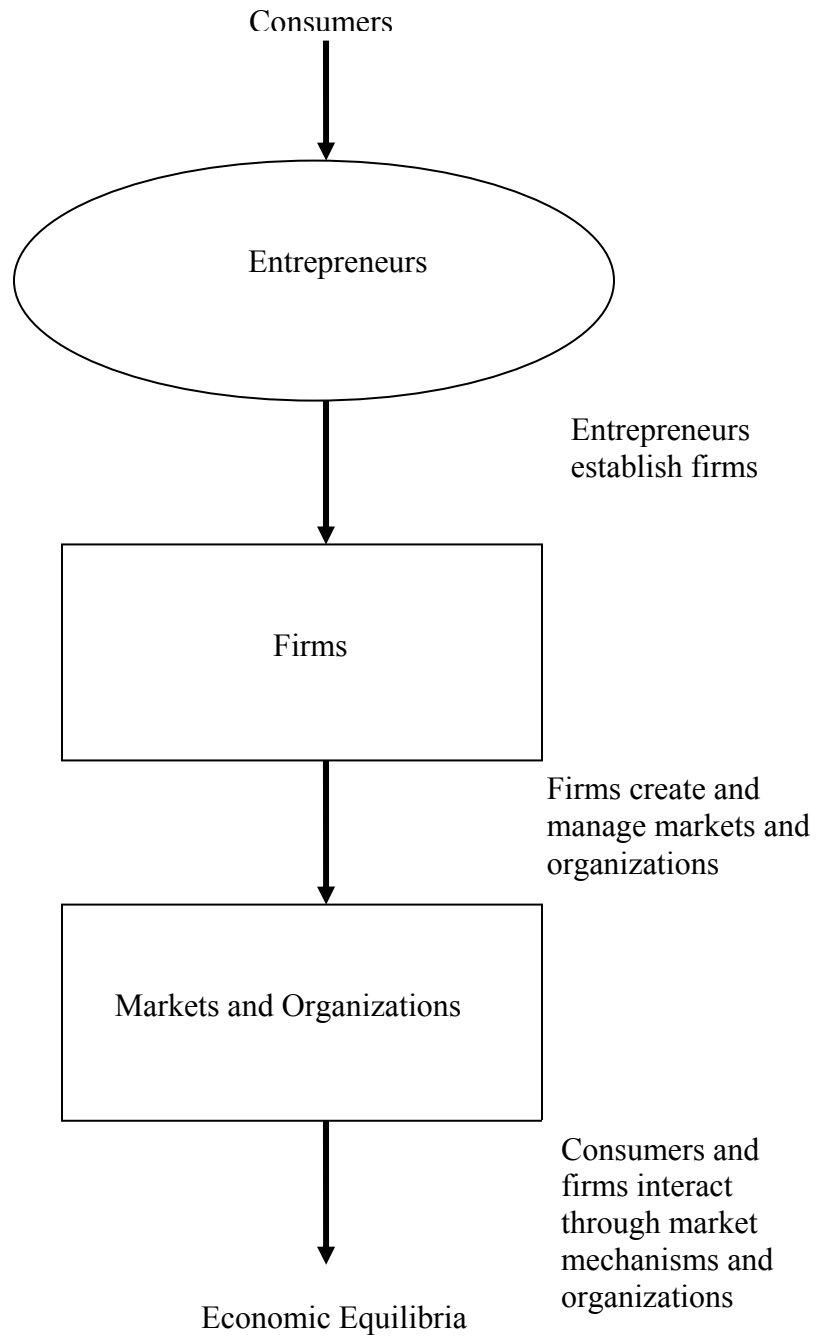


Figure 1 Microeconomics with endogenous entrepreneurs, firms, markets and organizations

The connection between the entrepreneur and market making can be illustrated by the example of Amazon.com. Entrepreneur Jeff Bezos established the firm which in turn created a vast set of online markets for a wide range of products. These products were grouped into such broad categories as (1) books, music, and movies, (2) toys & video games, (3) consumer electronics, (4) computer and office, (5) tools and automotive, (6) food and household, (7) home and garden, (8) clothing and jewelry, (9) health and beauty, (10) kids and baby, and (11) sports and fitness. Within these broad categories were over 40 product categories containing many thousands of products from many manufacturers. These represented thousands of markets where Amazon brought together buyers and sellers. Amazon served tens of millions of buyers and over one million sellers. Amazon also offered start-up sellers an alternative to “heavy lifting,” by providing web hosting and transaction intermediation.

The connection between the entrepreneur and organizations can be illustrated by the example of Intel. Entrepreneurs Bob Noyce and Gordon Moore established the firm which in turn created an organization that had more than 90,000 employees within forty years of its founding. The firm was structured around five groups: three groups were based on the company’s technology platforms for mobility, the digital enterprise and digital home, another group was concerned with digital applications in healthcare, and another group dealt with worldwide distribution. The firm had a worldwide network of R&D laboratories, the firm’s researchers focused on advanced computing, communications, and wireless technologies. The firm operated manufacturing plants for producing microprocessors, component assembly, and quality testing, and conducted research on manufacturing processes.

Individual members of the society establish firms to facilitate, formalize, and enhance economic relationships. The social and economic origins of the firm should be reflected in the structure of the economic theory of the firm. Rather than being given exogenously, firms arise endogenously because consumers choose to become entrepreneurs. Consumer characteristics are the givens and firms are the result of consumer decisions. The existence of firms, their purpose, and their organizational structure depend on the decisions of the entrepreneur.

The entrepreneur establishes a firm to achieve a desired economic objective. As with any type of man-made instrument, the firm augments the abilities and capacity of the entrepreneur who creates it. The individual becomes an entrepreneur because establishing a firm allows him or her to accomplish something that otherwise could not be done as effectively.

Consumers have preferences over consumption bundles. They own endowments of goods and services. They own production technologies and can carry out manufacturing using those technologies. Consumers also possess ideas, capabilities, skills, blueprints, transaction methods, and other types of intellectual property. Consumers can invent new technologies and can exchange them. Consumers also have the capacity to perform various activities, acting as inventors, investors, managers, and workers.

In the theory of the firm with endogenous entrepreneurs, the exogenous data of the model are the characteristics of consumers. The characteristics of entrepreneurs, including preferences and income have been studied extensively and data is available to

examine their decisions to establish firms.⁵ In addition, the consumer decision depends on knowledge of production and transaction technologies and ownership of intellectual property, such as patents, copyrights, industrial processes, brands, and trademarks. The consumer's education, training, and experience are likely to influence the decision to become an entrepreneur. The individual's access to information about market opportunities is critical to making business decisions. The consumer's abilities, interests, creativity, and business judgment can enter into the decision to become an entrepreneur.

Market opportunities open to the individual are crucial to the decision to become an entrepreneur. The entrepreneur combines his capabilities with market opportunities.⁶

⁵ Reynolds (2000) reviews the National Panel Study of U.S. Business Startups, which provides an extensive and detailed statistical overview of new businesses and the personal characteristics of entrepreneurs. The personal information that is studied includes all of the usual demographic data such as age, sex, ethnic background, education, and household income. In addition, interviews and questionnaires are used to obtain information about the entrepreneur's motivation, expectations, knowledge, career experiences, competitive strategy, decision-making style, and risk preferences.

⁶ Shane (2003, p. 4) defines entrepreneurship as "an activity that involves exploitation of opportunities." Shane emphasizes that entrepreneurship involves interaction between the individual characteristics of entrepreneurs and the set of market opportunities. He stresses the effects on opportunities of changes in technology, regulation and public policy, and social and demographic conditions. Shane (2003, p. 18) observes that "the

The interaction between the entrepreneur's characteristics and the menu of market opportunities recalls a traditional framework in the field of management strategy. The manager of the firm examines the firm's opportunities and competitive threats. The manager then considers the firm's strengths and weaknesses. The manager formulates a competitive strategy by making the best match between the firm's characteristics and the choice of opportunities.⁷ The entrepreneur makes a similar choice by making the best match between his own personal characteristics and market opportunities. The entrepreneur establishes a firm that involves the best combination of his personal talents and endowments and the menu of available opportunities. Such a combination will maximize the entrepreneur's profit.

examination of opportunities that are available to the entrepreneur is a central but largely overlooked aspect of entrepreneurship.”

⁷ The notion that both external analysis and internal analysis are vital for strategy making draws upon Kenneth R. Andrews (1971, p. 48), who wrote that “Economic strategy will be seen as the best match between qualification and opportunity that positions a firm in its product/market environment.” Andrews stated that “Determination of a suitable strategy for a company begins in identifying the opportunities and risks in its environment” (p. 48). Andrews observed that “opportunism without competence is a path to fairyland,” (p. 70). Bourgeois (1985), citing Andrews, puts describes “strategic fit” as follows: “The central tenet in strategic management is that a match between environmental conditions and organizational capabilities and resources is critical to performance, and that a strategist's job is to find and create this match.”

2. A Dynamic Theory of the Entrepreneur

This section presents a dynamic theory of the entrepreneur. The dynamic setting is useful in understanding the entrepreneur's decision problem. At the beginning, nature reveals information to the consumer, including the consumer's preferences, endowment, technological knowledge, and intellectual property. If the consumer decides to establish a firm, the consumer becomes an entrepreneur and creates a startup. The individual plays the role of the entrepreneur only up to the time that the firm is established. When the startup becomes a firm, a foundational shift occurs, the consumer's role changes from that of an entrepreneur to that of an owner of the firm. This section examines the dynamic theory of the entrepreneur. The dynamic theory of the entrepreneur is illustrated in Figure 2.

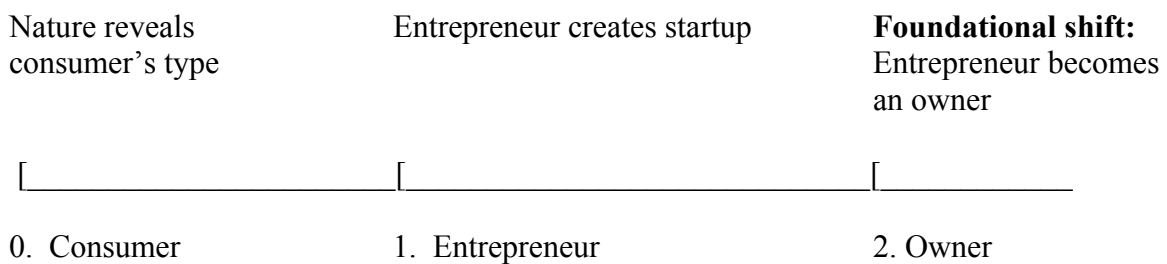


Figure 2 A dynamic theory of the entrepreneur: the foundational shift.

2.1 The Foundational Shift

As Schumpeter (1934) points out, being an entrepreneur is “not a lasting condition.” The entrepreneur takes time to establish a firm. Kaplan, Sensoy, and Strömberg (2005), study 49 venture-capital-financed companies and find that the average time elapsed from early business plan to public company is almost six years. The relative importance of human capital, especially the entrepreneur’s expertise declines over time, while there is an increase in the importance of intellectual property, patents, and physical assets. The entrepreneur can continue his association with the firm as an owner and can keep working to develop, expand and diversity the firm. Alternatively, the consumer can divest his ownership share. After becoming an owner, entrepreneur can choose whether or not to continue to exercise control and obtain returns from the firm without necessarily affecting the survival of the firm. The firm is an offspring with an independent identity and its own objectives.

An institution satisfies the separation criterion if the objectives of the institution can be distinguished from those of its owners. Consumers form all sorts of transactions, contracts, and organizations that should not be classified as firms. These institutions may perform some functions that are similar to those carried out by firms, including intermediation of transactions. These organizations may be precursors to firms and may evolve into firms. However, many types of consumer organizations have objectives that are often not separable from the interests of consumers who establish, own, manage, or are members of the organization. Generally, consumer organizations maximize the benefits of their members, so that the organization’s objectives are not separate from the consumption interests of its members.

What makes the foundational shift so important is the contrast between the economic role of the entrepreneur and the economic role of the firm. What gives content to this seemingly straightforward distinction is the characterization of the firm. A firm is defined to be a transaction institution whose objectives are distinct from those of its owners.⁸ Thus, consumer organizations such as clubs, buyers' cooperatives, workers' cooperatives, merchants' associations, nonprofits, and basic partnerships are not firms. The "separation criterion" distinguishes a firm from consumer organizations. A firm adds value to the economy because the separation of objectives gives it capabilities that consumer organizations cannot achieve.

The entrepreneurial startup enterprise does not satisfy the separation criterion. The objectives of the startup generally are not separable from those of the entrepreneur who is the owner of the startup. The entrepreneur's consumption objectives are closely tied to the entrepreneur's objectives in managing the startup. The entrepreneur provides financing so that the entrepreneur's personal budget constraint is interconnected with the startup's costs. The entrepreneur's consumption objectives are also interconnected with the objectives of the startup because the entrepreneur provides labor and management effort to the startup. Separation of objectives only occurs when the firm is established and the entrepreneur becomes an owner.

Consumers choose to become entrepreneurs based on two primary considerations: personal characteristics and market conditions. Individual characteristics of the consumer that affect the decision to start a firm include the consumer's preferences and endowments. Preferences are important because the entrepreneur may derive greater

⁸ See Spulber (2008), The Theory of the Firm.

satisfaction from the creative process of establishing a firm in contrast to management positions or various types of employment. Holtz-Eakin et al. (1994a, b) show that the entrepreneur's income and wealth matter. Using estate and income tax data, they find that the size of an inheritance affect the likelihood of a consumer becoming an entrepreneur, presumably by relaxing liquidity constraints.

2.2 The Separation Theorem

Before turning to the implications of separation for entrepreneurship, it is useful to consider the conditions under which separation occurs. Fisher (1906, 1907, 1930) addressed the separation of the firm's investment decisions from the owners' consumption and saving objectives. The firm's optimal investment decisions are independent of the preferences of its owners and independent of how the investment is financed. The firm's owners are only affected by the firm's decisions through their wealth. They carry out their consumption and saving decisions through product markets and financial markets. Fisher's separation theorem is in the neoclassical tradition and requires price-taking behavior by both consumer-owners and firms. The Fisher separation theorem assumes that there are no transaction costs and that there exists a complete set of competitive markets.

The Fisher Separation Theorem depends on price taking behavior by firms and consumers and the presence of neoclassical markets for consumer goods, investment goods, and financial capital. The Fisher Separation Theorem provides a foundation for the study of the firm's investment decisions. The firm is owned by consumers who have preferences over current and future consumption bundles. The Fisher Separation

Theorem shows that the firm's investment decisions are independent of the consumption decisions of its owners. Consumer-owners receive a share of the present value of the firm's profits. Accordingly, consumer-owners unanimously agree that the firm should maximize the present value of profits.

The Fisher Separation Theorem further shows that the firm's investment decisions are independent of how the firm finances its investment. The level of investment maximizes the present value of profits, so that the efficient investment level equates the marginal return to investment to the marginal cost of investment. Investment might be financed from an initial endowment of funds or through borrowing, or in some other manner such as issuance of securities. This will not affect the investment decision in Fisher's framework.

The Fisher Separation Theorem is planted firmly in the neoclassical tradition. It explains why firms make investment decisions and why consumers do not. It provides a foundation for the study of investor decisions in financial markets. However, the Fisher model maintains the neoclassical assumptions that markets are established and operate without costs. This section reexamines the Fisher separation analysis when there are transaction costs.

Consider a consumer who lives for two periods and consumes the same good in each period. Let c and C represent the amounts of consumption good consumed in the two periods. The consumer's preferences are represented by the separable utility function

$$(1) \quad U(c, C) = u(c) + \frac{1}{1 + \rho} u(C),$$

where ρ is the consumer's rate of time preference. The function $u(c)$ is differentiable, increasing and concave. The consumer has an initial endowment of the consumption

good equal to ω that is available in the first period and an endowment Ω that is available in the second period. There is a market for the consumption good in each period. The consumer can purchase or sell the good in either period. Let p be the price of the good in the first period and let P be the price of the good in the second period. The consumer takes the prices of the goods as given exogenously. The consumer has access to a capital market and can borrow money or save money at interest rate r , also taken as given exogenously. Suppose that the consumption good is not storable. The consumer's budget constraint expressed in present value terms is

$$(2) \quad pc + \frac{PC}{1+r} = p\omega + \frac{P\Omega}{1+r}.$$

The consumer borrows $p(c - \omega)$ if $\omega < c$ or saves $p(\omega - c)$ if $\omega > c$. The consumer maximizes utility subject to the budget constraint so that first and second period consumption solve

$$(3) \quad u'(c^*) = \frac{1}{1+r} u'(C^*)(1+r) \frac{P}{p},$$

where $C^* = (1+r)(p/P)(\omega - c^*) + \Omega$.

Suppose that the consumer owns a firm. The firm is described by its production function as in the neoclassical model. The input to the production function is the consumption good in the first period and the output of the production function is the consumption good in the second period. The input to production is K and the output of the production process is Q . The investment level K results in a capital stock of equal amount that only provides services for a single period before being used up. Production involves a one-period lag so that output only is available in the second period. The

production function is $Q = f(K)$, which is differentiable, increasing, and concave, and $f(0) = 0$.

Consider the financing and investment decisions of the firm. If the firm has no initial endowment, it can fully finance investment by borrowing money at interest rate r . The firm's investment decision will be the same regardless of whether it has an initial endowment of money. The firm purchases K units of the consumption good at price p to invest in production. The firm's investment decision will be the same regardless of whether it has an initial endowment of the consumption good. The firm sells its output in the second period at market price P . The firm's profit in present-value terms is

$$(4) \quad \Pi = \frac{Pf(K)}{1+r} - pK.$$

The firm's optimal investment decision equates the marginal revenue product of investment to the per-unit cost of investment,

$$(5) \quad Pf'(K^{**}) = p(1+r).$$

The per-unit cost of investment is the purchase price of the consumption good times the cost of borrowing. The profit-maximizing investment is shown in Figure 3.

Consider a Robinson Crusoe economy in which the consumer owns the firm. Suppose further that there is no capital market so that there is no possibility of borrowing or lending money. Suppose further that there is no possibility of buying or selling the consumption good. Then, the consumer will manage the firm to maximize the consumer's benefit subject to the production function. The consumer solves

$$\max_{c, C} u(c) + \frac{1}{1+\rho} u(C)$$

subject to $C = f(\omega - c) + \Omega$ and $c \leq \omega$. The optimal consumption c^0 solves

$$(6) \quad \frac{u'(c^0)}{u'(C^0)/(1+\rho)} = f'(\omega - c^0),$$

where $C^0 = f(\omega - c^0) + \Omega$, if there is an interior solution $c^0 < \omega$. The solution for the Robinson-Crusoe economy is represented in Figure 4 with investment on the x axis and second-period consumption on the y axis, letting second-period endowment Ω equal zero.

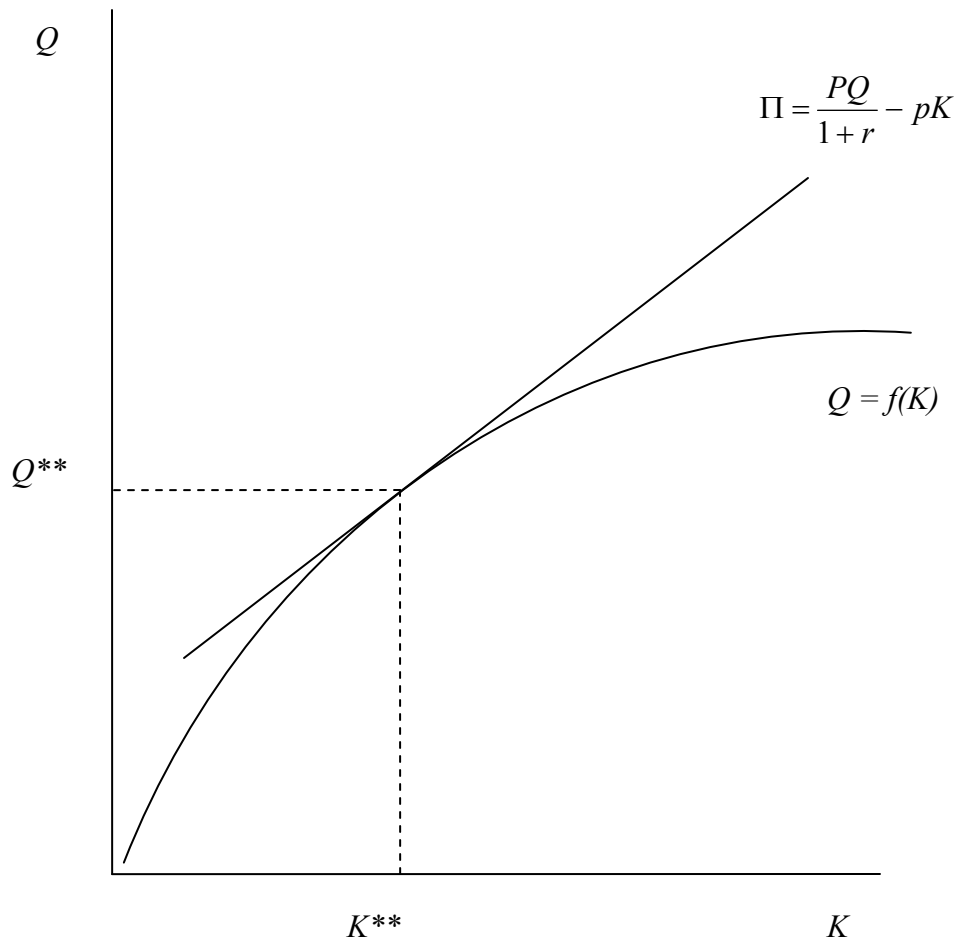


Figure 3 Profit-maximizing investment by a price-taking firm.

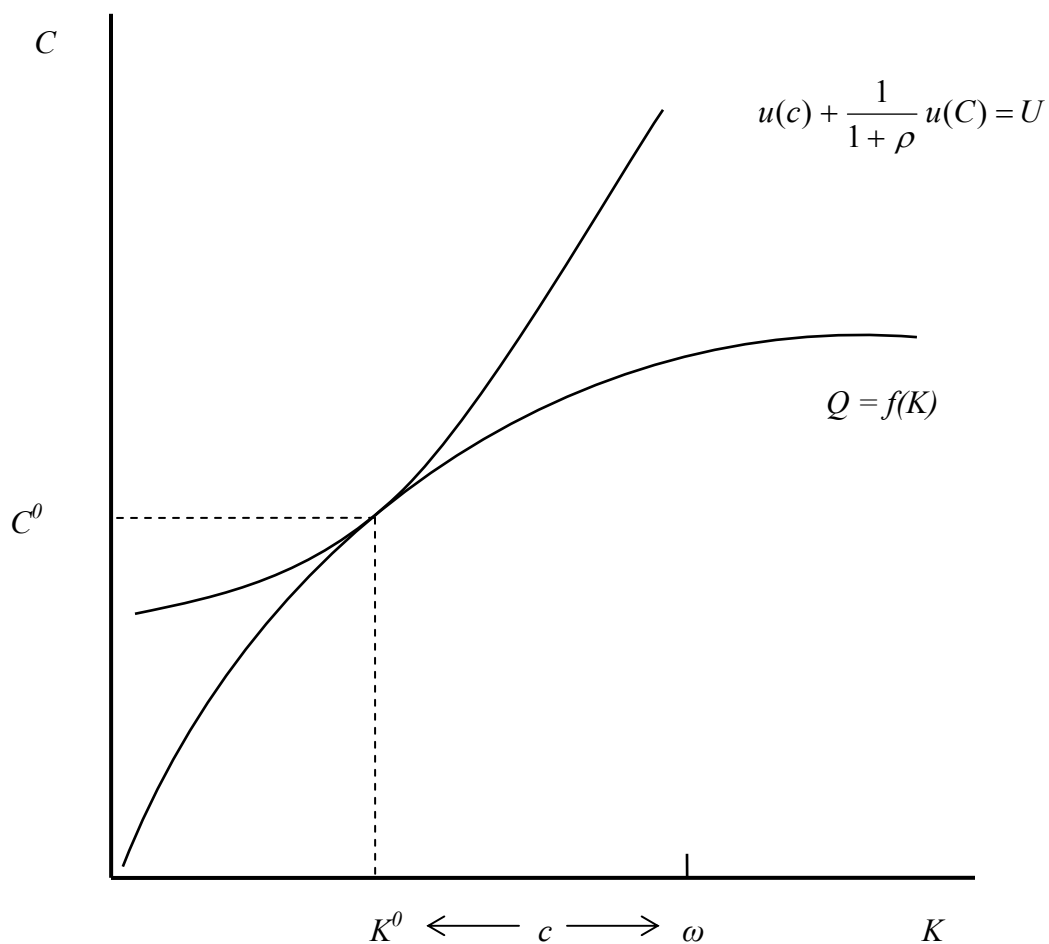


Figure 4 Optimal investment in the Robinson Crusoe economy.

Consider now the situation in which a consumer owns the firm but both the consumer and the firm have access to product and capital markets. The firm's investment decision is independent of the preferences of its consumer-owner. The consumer-owner wishes to obtain the greatest present value of profit so the firm chooses the profit-maximizing investment. Then, taking the firm's profit as given, the consumer maximizes

utility subject to the consumer's endowment plus the firm's profit. The consumer problem is

$$\max_{c, C} u(c) + \frac{1}{1 + \rho} U(C)$$

subject to

$$(7) \quad pc + \frac{1}{1 + r} PC = p\omega + \Pi + \frac{P\Omega}{1 + r}.$$

The consumer's first-order condition is

$$(8) \quad \frac{u'(c^*)}{u'(C^*)/(1 + \rho)} = \frac{p}{P/(1 + r)}.$$

The consumer's second-period consumption is equal to

$$C^* = (1 + r)(p/P)(\omega - c^*) + \Omega + (1 + r)(1/P)\Pi.$$

The Fisher Separation Theorem demonstrates that the consumer is better off letting the firm choose the profit-maximizing investment instead of the utility-maximizing investment. This is depicted in Figure 5. The consumer has a different consumption profile in the Robinson Crusoe economy from that in the market economy. With initial endowment ω , the consumer invests K^0 and consumes $c^0 = \omega - K^0$ and $C^0 = f(\omega - K^0)$ in the Robinson Crusoe economy. The consumer in the market economy consumes $c^* = \omega - K^*$ and $C^* = (1 + r)(p/P)K^* + (1 + r)(1/P)\Pi^*$. The consumer in the case depicted in Figure 5 has a higher amount of consumption in the first period in the market economy as compared to the Robinson Crusoe economy, since the consumer uses less of the initial endowment, $K^* < K^0$. In the case shown, the consumer consumes less in the second period in the market economy as compared to the Robinson Crusoe economy but is still better off. The benefits of additional consumption in the first period outweigh

the benefits of less consumption in the second period. The additional consumption in the first period occurs because the firm purchases more of the investment good in the market than the consumer supplies to the market $K^* < K^0 < K^{**}$. The firm invests more in the market economy than in the Robinson Crusoe economy in the case shown in Figure 5. The consumer supplies less of the endowment of the investment good in the market economy than in the Robinson Crusoe economy in the case shown in Figure 5. This illustrates how the market for goods and the market for capital investment allow the decoupling of the firm's investment decision and the consumer's saving and consumption decisions.

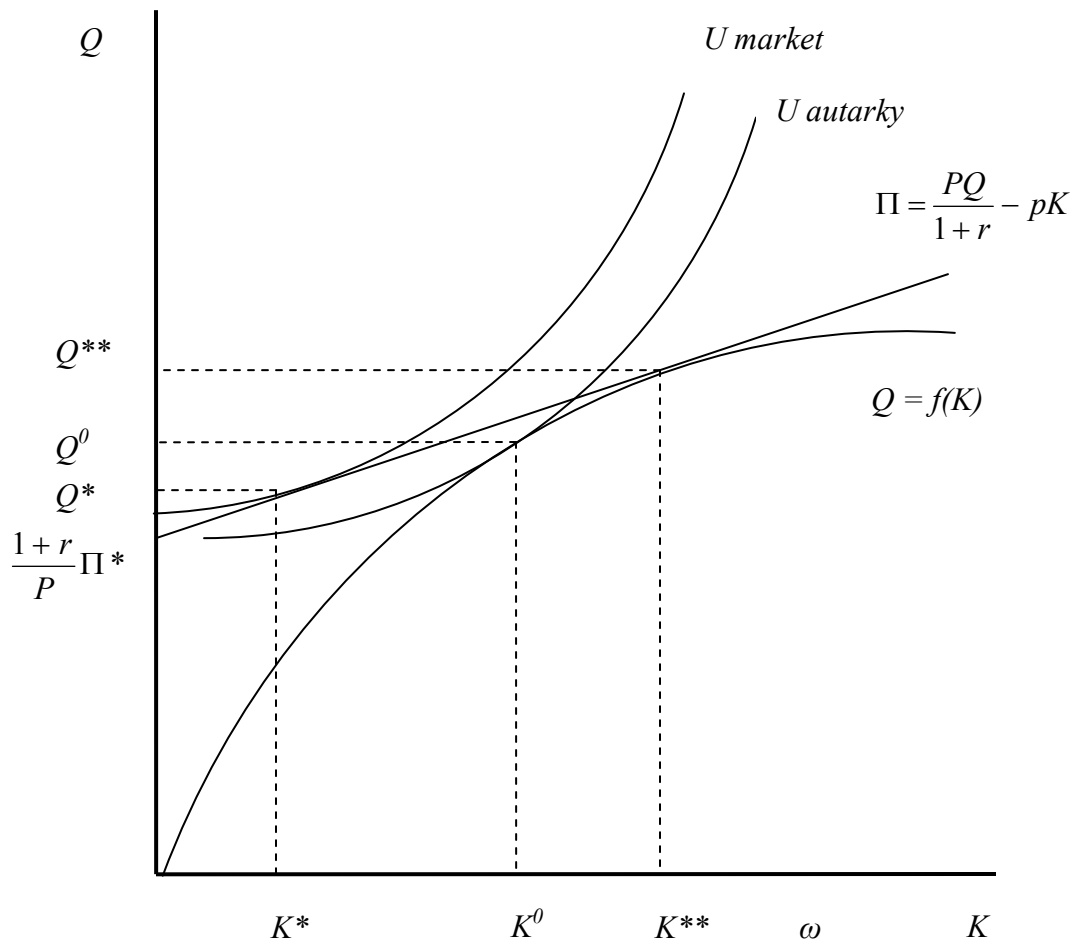


Figure 5 The Fisher Separation Theorem shows that the firm's optimal investment decision is independent of the preferences of a consumer-owner.

The Fisher Separation Theorem depends critically on the existence of three types of markets: for the investment good, for the consumption good, and for financial capital. This dependence is obscured in the standard presentation by the triple nature of the good that can be used for investment, consumption and financial transactions. The Fisher

Separation Theorem depends also on the absence of transaction costs. Not only are markets established exogenously, but neither the consumer nor the firm face a bid-ask spread in their market transactions. Again, the consumer is made better off when consumer decisions and firm decisions are separated because of the presence of outside opportunities. Both the consumer and the firm realize gains from trade through their market transactions with other unobserved consumers and firms. These gains from trade are achieved without transaction costs.

The Fisher Separation Theorem explains why consumption and firm investment decisions can be separated but does not identify an economic role for the firm. The framework is neoclassical with the firm being fully described by its production technology. Both the consumer-owner and the firm are price takers. The firm chooses an investment and output plan taking prices as given and the consumer solves a consumption-saving problem. The decision of the consumer and the firm are separable because both the consumer and the firm realize gains from trade with other trading partners. The consumer wants the firm to maximize its profit because the consumer is only interested in the firm as a source of income. The consumer makes consumption and saving transactions and the firm makes sales and investment transactions in established markets.

2.3 Before the Foundational Shift

The entrepreneur's objectives are closely connected to those of the startup. The startup thus is distinct from an established firm. The interconnection between the

entrepreneur's objectives has important implications in five main areas: investment, employment, effort, innovation, and business strategy.

Investment The entrepreneur investment decisions are combined with his consumption-savings decisions. These objectives are closely connected because the entrepreneur contributes to financing the start-up, along with family and friends. These effects are due to imperfections in the relationship between the entrepreneur and sources of financial capital, which may result from asymmetric information. The decision about the date at which to launch the firm also depends on the entrepreneur's own consumption objects. The entrepreneur's realization of income from the project depends on the timing of the establishment of the firm. Again, asymmetric information plays a fundamental role because of difficulties outside investors face in determining the value of the prospective firm. Contracts with venture capitalists are a means of providing information to the capital markets for the IPO. The entrepreneur is a party to contracts with venture capitalists and others involved in the startup enterprise.

Before the foundational shift occurs, transaction costs often are the most important type of costs incurred by the entrepreneur. The entrepreneur learns about the industry and makes contacts with potential customers and suppliers. There are substantial transaction costs associated with search, communication, negotiation and forming relationships with prospective customers and suppliers. The entrepreneur incurs transaction costs in assembling the productive inputs and technology needed to establish the firm.

Employment The entrepreneur's effort decisions are combined with his labor market decisions. These objectives are closely tied because the entrepreneur contributes to the management and labor of the startup. As with financing, the entrepreneur's hiring decisions can be based on personal relationships, with family and friends compensated through informal arrangements. Asymmetric information prevents the entrepreneur from making full use of the labor market to hire workers and managers, thus requiring the entrepreneur to do much of the initial work or to obtain additional labor inputs through contracts with venture capitalists. Asymmetric information also may affect the entrepreneur's ability to realize returns from his ideas through an employer, which can lead to the decision to quit the job and create a startup.

Effort Due to the entrepreneur's participation in financing the startup and providing management and labor to the startup, the entrepreneur's labor-leisure decisions are not separable from the employment decisions of the startup. The entrepreneur's labor-leisure tradeoffs are affected by income effects which depend on his investment in the startup and anticipation of earnings from establishing the firm. This may explain why many researchers emphasize the entrepreneur's personal enjoyment, creativity, drive, preferences, attitude toward risk, rate of time preference. The entrepreneur's preferences and other characteristics drive effort decisions so that the consumption objectives of the entrepreneur are not separable the employment decisions of the startup.

The entrepreneur often devotes significant effort to raising financial capital from banks and investors. Financial transaction costs are thus part of the entrepreneur's costs.

In addition, the entrepreneur's costs include the effort and resources devoted to information gathering and learning. To establish the firm, the entrepreneur is likely to require information about the needs and characteristics of potential consumers, the availability and features of alternative products, the technology required to manufacture the product, and the business methods involved in supplying the product. The entrepreneur must gather other types of market knowledge including the prices of comparable products and the prices of productive inputs needed to provide the good. The entrepreneur may need to purchase the technology used to provide the good.

The entrepreneur takes into account the opportunity cost of his time, given his skills and other abilities. The entrepreneur will spend time researching and develop the idea of the business. The entrepreneur may need to devote time and effort to developing the skills needed to understand and apply the technology. The entrepreneur will invest time in the process of setting up the business and forming the organization.

The entrepreneur's personal satisfaction can offset some of the costs incurred to establish the firm. The entrepreneur may derive consumption benefits from establishing the firm. The process of establishing a firm can be creative, entertaining, informative and enjoyable. Then, the per-period costs of establishing the firm reflect the entrepreneur's costs net of the benefits of being an entrepreneur. The costs of establishing a firm reflect the consumer-entrepreneur's idiosyncratic productivity and costs of effort. The costs also include the entrepreneur's use of resources, labor and capital.

Innovation The entrepreneur's innovation decision is combined with a technology market decision. Asymmetric information about the entrepreneur's ideas

prevents full use of the market. This helps to explain why the entrepreneur chooses to embody the technology in the new firm rather than to license the technology to other individuals or to other firms. This applies to new products, new processes, new business methods, and new forms of organization. The innovation decisions of the entrepreneur are closely tied to the entrepreneur's personal knowledge, information, and intellectual property.

Business Strategy The close tie between the entrepreneur's consumption objectives and the objectives of the startup project do not allow for the separation of ownership and control. The entrepreneur's choice of management strategy – rate of growth, what markets to serve, what suppliers to contract with – reflect the limitations and constraints from the entrepreneur's other decisions.

The entrepreneur must devise a business plan to guide the new enterprise and to attract investment. Typically, the business plan includes the entrepreneur's vision of the business and a description of the objectives of the new enterprise. The business plan also features a strategic analysis of the markets that will be served by the firm and the competitors that will be encountered. The entrepreneur formulates a competitive strategy and examines potential sources of competitive advantages for the new business.

The planning process also includes an examination of what production technology will be used, what types of products and services the business expects to provide, and how the firm will market, sell and distribute its offerings. The business plan features a preliminary organizational structure for the new enterprise. The business plan includes

projected costs and revenues and a financial analysis of the capital resources needed to establish the firm. The entrepreneur bears the costs of preparing the business plan.

2.2 After the Foundational Shift

The foundational shift, from entrepreneur to owner, is what makes the firm such a valuable economic actor. With separation of objectives, the firm pursues activities that maximize its profit. The foundational shift allows the firm to provide limited liability for its owners. Establishing a firm provides an additional actor to the economy that augments the variety of potential transactions. For example, the firm can serve as an intermediaries between buyers and sellers. The firm is a transaction institution with capabilities that differ from those of consumer organizations. Because firms maximize profits, they can select different allocations and contracts than consumer organizations that maximize the average benefits of their members.

The entrepreneur's costs of establishing the firm should be distinguished from the costs of the firm itself, which start to be incurred once the firm begins its operation. The entrepreneur incurs costs during the period that he is establishing the firm. The entrepreneur necessarily bears risk in practice because of the delay between the time that he begins to establish the firm and the time the firm begins to operate. This time lag introduces uncertainty about the firm's profit. The dynamic nature of the entrepreneur's activity implies that starting a firm is a type of investment.

The transaction costs of establishing a firm limit entry and reduce the erosion of profit by competitive entry. Moreover, costly transactions mean that competitors will encounter difficulties discerning and in imitating entrepreneurial innovations. Economic

frictions reduce the prospect of perfect competitive challenges. Economic frictions further provide opportunities for entrepreneurs to establishing market making firms that earn rents from mitigating transaction costs.

The entrepreneur acts in pursuit of entrepreneurial profit. The reward of the entrepreneur is a share of the economic value of the firm. In turn, the firm's economic value depends on its provision of transaction efficiencies that the economy cannot attain otherwise. Accordingly, consumer-entrepreneurs choose to establish firms if and only if doing so increases transaction benefits net of transaction costs in comparison with the best institutional alternative. The firm is an economic actor that is distinct from the entrepreneur once the foundational shift takes place.

After the firm is established, the consumer's role undergoes the foundational shift from entrepreneur to owner of the firm. From the point of view of the consumer-owner, the firm becomes a financial asset at the date that it is established. As an owner, the consumer obtains rights of residual control over the firm's activities. The consumer also obtains residual returns equal to the firm's revenues net of expenditures including debt payments and residual claims of other owners.

The consumer-owner wishes the firm to maximize profit so as to increase the owner's income rather than making decisions to benefit the owner as a consumer. As a consequence of the Fisher Separation Theorem holds, the entrepreneur receives the rewards of ownership after the firm is established. After the foundational shift, the consumer no longer acts in the economic capacity of an entrepreneur, having completed the task of establishing the firm. The owner of the firm can divest his share of the firm or

direct the firm's activities using rights of residual control. The firm acts under the authority delegated to it by its owners.

The entrepreneur may supply essential inputs, such as the entrepreneur's reputation, talents, creativity, and other unique services, on a contractual basis once the firm has become established. Although the owner may exercise considerable control over the firm, the firm generally is distinguished from the owner's personal budget and personal activities. After the foundational shift occurs, there is a separation of the owner's consumption decisions from the firm's decisions.

The entrepreneur can maintain a connection to the firm after the foundational shift by remaining as an owner and also by performing such functions as manager, consultant, supplier, or customer. The entrepreneur can still be creative and innovative as an owner and manager, or the entrepreneur can delegate these duties to managers and employees. After the foundational shift, the entrepreneur can choose to end all economic ties to the firm by divesting the ownership share. Even after divesting his ownership share, the consumer can maintain other economic relationships with the firm.

After it is established, the firm is a new economic actor. The firm plays various economic roles as a seller of outputs, a buyer of resources, a borrower of finance capital, an employer of workers and a party to contracts. The firm is an intermediary that matches buyers and sellers and makes markets. The firm's managers choose goals, strategies to achieve the goals, and means to implement strategies. Although it acts under delegated authority, the newly-established firm is an additional decision maker in the economy.

The entrepreneur does not earn money directly. The entrepreneur often does not earn anything while he is establishing the firm because the entrepreneur receives

payments by becoming an owner of the firm. The entrepreneur is rewarded based on the quality of his product. As in professions such as science and art, the entrepreneur earns money indirectly by creating something new. This indirect payment may explain why entrepreneurs say that they do not do it for the money. Of course, entrepreneurs also may enjoy the creative process involved in designing the firm and seeing it take shape.

The return to being an entrepreneur is a share of the value of the firm at the time it is established. The value of the firm is affected by market demand and supply conditions and by transaction benefits and transaction costs. Competition with other firms is a major determinant of the firm's value. The motivation of the entrepreneur is to obtain the value of the firm. The value of the firm depends on the entrepreneur's market knowledge, organizational design, and intellectual property.

When the Fisher Separation Theorem applies, the firm's decisions are separate from the consumption decisions of its consumer-owners. The consumer-owner receives the firm's profit based on his ownership share of the firm. The consumer also makes consumption decisions that are independent of the firm's profit maximization decisions. The entrepreneur's profit is equal to a share of the value of the firm, discounted to account for the time it takes to establish the firm, less the costs that the entrepreneur incurs in establishing the firm. The entrepreneur's profit is the consumer's incentive to become an entrepreneur. The entrepreneur only begins to receive a return after the foundational shift takes place.

The entrepreneur obtains the value of the firm by becoming an owner of the firm at the time the firm is established. As an owner, the entrepreneur receives the firm's profit by remains an owner of the firm over time and thereby receiving the residual

returns from the firm's operation. Alternatively, the entrepreneur can realize the value of the firm by selling the firm to others after it is established. The entrepreneur also can form contracts with potential buyers that allow the firm to be sold before it is established.

The theory of investment yields insights into the entrepreneur's problem. The entrepreneur may experience adjustment costs in establishing the firm. The faster the firm is established the greater the costs of establishing the firm. The entrepreneur may face a tradeoff between the high cost of rapidly establishing a firm and the cost of delay in obtaining the value of the firm. As in any standard investment problem, the entrepreneur can choose the amount to invest in the firm. More generally, the entrepreneur chooses the characteristics of the firm that he plans to establish, which in turn affect the value of the firm and also determine the costs of establishing the firm.

The entrepreneur's profit can be generalized easily to incorporate uncertainty about the future value of the firm. The entrepreneur may wish to delay establishing the firm as a means of learning more about the market. If the start date depends randomly on the stream of expenditures made to establish the firm, the entrepreneur's problem resembles a standard research and development (R&D) problem.⁹ The entrepreneur can choose the optimal level of investment at each date that reflects the tradeoff between the cost of investment and the forgone return due to the expected delay in establishing the firm. The entrepreneur must make decisions that determine the market activities and organizational design of the firm. The entrepreneur's profit depends the entrepreneur's strategy and on the intensity of competition.

⁹ This can be modeled as in the patent race literature, see Reinganum (1981, 1982) and see Reinganum (1989) for a survey.

3. Type-I Competition: Competition between Entrepreneurs

Entrepreneurs compete with each other by determining whether or not to establish a firm. Entrepreneurs consider their costs of establishing a firm and the relative value that their firm will add to the market. They compare the costs of establishing a firm and the value a firm will add with those of other entrepreneurs. As a result, some consumers will choose not to establish a firm because of the competitive activities of other entrepreneurs.

Entrepreneurs also compete by proxy in the market. If there are multiple new firms that compete in the same industry, entrepreneurs will take this into account when deciding whether or not to establish a firm. Entrepreneurs also will consider proxy competition in designing the firms that they establish.

Not all consumers choose to become entrepreneurs, and not all entrepreneurs successfully establish firms. The entrepreneurial process helps to determine what will work best in the market place. Entrepreneurs effectively conduct economic experiments that test the relative effectiveness of the production and transaction technologies. Entrepreneurs who compete to establish firms perform the valuable function of comparing and selecting the best technologies.

Entrepreneurs compete to establish firms so that they effectively compete for final customers. Entrepreneurs who compete to enter the market also implicitly compete for inputs. Scarce inputs not only include resources, labor, and capital, but also production and transaction technologies. In a competitive setting with full information, the most efficient entrepreneurs obtain resources to establish firms.

Entrepreneurs compete with each other by deciding whether or not to establish firms. Entrepreneurs make their establishment decisions based on information about the characteristics of competing entrepreneurs. Entrepreneurs only establish firms if they believe that the expected value of the firm they set up will be sufficient to justify the costs of establishing the firm. Accordingly, an entrepreneur must evaluate the potential contribution the new firm will make in competition with the firms that other entrepreneurs plan to establish.

Competition between entrepreneurs depends on many factors that can be summarized by differences in individual preferences and endowments. In terms of preferences, entrepreneurs can differ in terms their degree of risk aversion, rate of time preference, and disutility of effort. In terms of endowments, entrepreneurs can differ in terms of ability, creativity, judgment, information, and wealth. Also, since consumers own technology, they can have different endowments of production technology or transaction methods.

Spulber (2008) presents a general equilibrium model of entrepreneurial competition and applies it to address various differences between entrepreneurs. The model can incorporate differences in entrepreneur preferences, including risk aversion, rate of time preference, and disutility of effort. The model can include differences in entrepreneur endowments, such as technology, information, and wealth. The equilibrium analysis of entrepreneurship shows how consumers decide whether or not to become

entrepreneurs. The model examines the effects of the size of the economy and the effects of demand and cost parameters on the equilibrium number of entrepreneurs.¹⁰

The model of the economy with endogenous entrepreneurs can be extended to generalize the type of firms established by the entrepreneur. The entrepreneur can choose between different types of organization – sole proprietorship, partnership, corporation. Poblete and Spulber (2007) examine an equilibrium model with homogeneous entrepreneurs who choose between different organizational forms. A sole proprietorship functions efficiently, while a partnership is subject to free riding, and a corporation is subject to moral hazard by a CEO. The type of firm that emerges in equilibrium will be a sole proprietorship when investment costs are low, a partnership when investment costs are in an intermediate range, and a corporation when investment costs are high. The wealth of entrepreneurs also affects the organization of the firm. When endowments are high, entrepreneurs will establish sole proprietorships, when endowments are in an

¹⁰ Spulber (2008) presents a series of general equilibrium models that examine many types of competition between entrepreneurs. The model considers monopolistic competition between firms after they are established, as in Dixit and Stiglitz (1977) and Lancaster (1980). The entrepreneurial competition model considers the general equilibrium for an economy in which any consumer may become an entrepreneur and establish a firm. The general equilibrium model extends the basic model of Richard Kihlstrom and Jean-Jacques Laffont (1979, 1982). Assuming that establishing firms is risky, they show that those consumers who become entrepreneurs are those who are the least risk averse.

intermediate range they will establish partnerships, and when endowments are low, they will corporation corporations.

4. Type-II Competition: Competition between Entrepreneurs and Direct Exchange between Consumers

Type-II competition refers to the contribution of the entrepreneur in comparison with direct exchange, that is, exchange between consumers without intermediation by firms. If firms do not contribute sufficiently to economic efficiency there is no need for entrepreneurs to establish firms. For entrepreneurs to establish firms, there must be sufficient gains in economic efficiency for the value of the firm to cover the costs of establishing a firm. Then, there will be an incentive for entrepreneurs to set up firms.

Consumers can undertake a variety of economic activities without the need for firms. Because consumers own production technologies and transactions technologies., they have the option of engaging in autarkic production. Consumers can develop inventions and put them into production without the need for firms. Consumers can create economic transactions without the need for centralized markets. Consumers can transact directly with each other through search, negotiation, barter, spot transactions, and contracts. Also, consumers can form organizations without the need for firms. For example, consumers can form buyers' cooperatives, sellers' cooperatives, worker cooperatives, and basic partnerships.

The entrepreneur competes with direct exchange by establishing a firm that creates organizations and markets. The entrepreneur will create value if the firm provides intermediated transactions that improve upon direct exchange. The firm's market making

activities should improve efficiency in comparison to decentralized exchange activities of consumers, including search, bargaining, and adverse selection. The firm's organization should improve efficiency in comparison to consumer organizations, such as buyer cooperatives, worker cooperatives, and basic partnerships. The organization established by a firm improves efficiency when it alleviates governance costs associated with free riding, moral hazard, and adverse selection in organizations.

The entrepreneur does not engage in head-to-head competition with direct exchange because it is the firm, once it is in operation, that must contend with direct exchange between consumers. The entrepreneur competes with direct exchange by proxy, that is, through the firm that he established. The entrepreneur's contribution is to anticipate the need for the firm as an intermediary and as an organization. The entrepreneur has an incentive to establish the firm only if the firm will add value relative to direct exchange.

There are many forms of type-II competition between entrepreneurs and direct exchange. Firms create markets by setting up and managing allocation mechanisms, including posted prices and auction markets. Firms provide services as intermediaries and design market microstructure, see the analysis presented in Spulber (1996a, b, 1998, 1999, 2002a,b, 2003). Firms centralize exchange by creating networks and matching buyers and sellers, see Spulber (2006). Firms establish and operate information systems that supply buyers and sellers with some of the means to communicate and process information. Firms engage in communication with buyers and sellers to gather information about their characteristics and to provide information about terms of exchange, such as prices and product features. Firms also provide computation to

improve the efficiency of matchmaking and market making activities, helping buyers and sellers search for each other, adjusting prices, and providing immediacy. In these ways, firms provide alternatives to direct exchange between consumers by intermediating transactions.

Firms also establish organizations that provide alternatives to direct exchange . The firm's organization manages its internal transactions and its market transactions. Transactions within the firm provide an alternative to market transactions between consumers. For example, consumers can combine their inputs, technology, and capabilities by supplying labor services to a firm rather than through market contracts with each other. The firm as a contracting hub reduces transaction costs through standardization and scale and avoids the complexities of multilateral contracting between many individuals.

The firm's organization also provides an alternative to consumer organizations. It is the autonomy of the firm that distinguishes it from consumer organizations such as consumer cooperatives, worker cooperatives and basic partnerships. The firm provides transaction efficiencies through relational contracts, delegation of authority, incentives for performance, monitoring, communication and information gathering, see the discussion of contracts and of agency in Spulber (1999).

5. Type-III Competition: Competition between Entrepreneurs and Existing Firms

The entrepreneur chooses to establish a firm if it will address market conditions more effectively than existing firms. Entrants can introduce capacity in response to

growth in market demand or they can provide products that respond to changes in customer preferences. Alternatively, existing firms can expand, diversify, or change their products.

The entrepreneur establishes a new firm if the entrant offers improvements in market transactions, organizational transactions, production technology, or products. Existing firms can address technological change by introducing their own new transaction methods, production processes, or new products. Entrepreneurs compete with established firms in terms of incentives for managerial performance. All other things equal, a new firm must offer greater efficiency if incentives for performance and opportunities to monitor performance are greater than within a established firm. Otherwise, an established firm could offer the same products by expanding or diversifying. Established firms also can offer organizational innovations by restructuring their firm to increase its efficiency. The entrepreneur must offer innovations more effectively than existing firms.

The entrepreneur's establishment decision thus results in a more efficient organization of the industry. The entrepreneur's entry decision plays an important economic role by displacing less efficient incumbents and stimulating innovation by existing firms. In the absence of demand growth and capacity constraints on existing firms, displacing incumbents requires innovation. But, innovation in itself is not enough. The entrepreneur must offer innovations that create add value that what incumbents can offer. This explains the great emphasis on innovation in economic discussions of the entrepreneur, particularly by Schumpeter.

5.1 Entry

Entrepreneurs compete with existing firms through their newly-established firm. The entrepreneur establishes a firm only if it adds value in competition with existing firms. Being newly established, the entrepreneur's firm necessarily is an entrant, and the entrepreneur devises the firm's strategy towards incumbents. The entrepreneur's competitive role ceases once market entry takes place.

Competition between entrepreneurs and established firms can be modeled using the plethora of Industrial Organization models of entry, see for example Spence (1977), Dixit (1980), and Spulber (1981). It is straightforward to interpret these models in terms of entrepreneurship, since all entrepreneurs must make a market entry decision. The entrant's strategies are also those of the entrepreneur. The strategies of incumbent firms in entry models also shed light on entrepreneurial decisions, since the entrepreneur considers the impact of future entry on the firm. The entrepreneur also takes into account the firm's future position as an incumbent in evaluating the value of the firm being established.

The entrepreneur's costs of establishing a firm should be considered as an important component of the entry costs that are examined in economic models of industrial organization. One of the key strategic aspects of entry is the need to make irreversible investments in transaction costs such as planning the new venture, marketing, conducting market research, and obtaining financing. Firms also must make irreversible investments in R&D to develop new products and production technologies.

The empirical industrial organization literature on entry sheds light on the entrepreneur. Geroski (1995) provides a useful overview of data and results in this area,

and finds that entry appears relatively easy but survival is not. Ease of entry calls into question many empirical studies that suggest the presence of high barriers to entry. The importance of entry as a means of introducing innovations helps to reconcile these opposing observations. Geroski suggests that entry may be imperfect as a means of short-term price competition. However, entry is a valuable mechanism for introducing product and process inventions, with the best products and processes selected through competition between firms once they are established and operating within the industry. Empirical analysis of entry thus supports the view of the entrepreneur as innovator.

Entrepreneurs can apply creative entry strategies and innovations to surmount potential advantages of incumbent firms. Growing market demand or changes in consumer tastes generate opportunities for entry. Technological change allows entrants to arrange novel transactions, introduce new products, or lower production costs. Bayus and Agarwal (2007) in a study of the computer industry find that technology strategies employed after entry are critical for firm survival.

If the incumbent and entrant offer differentiated products, price competition tends to be reduced. Both the incumbent and entrant will have the opportunity to earn profits in post-entry competition. Because a lower price than a competitor causes only some customers to switch their purchases, the incumbent and the entrant will not have an incentive to engage in an all-out price war. Since the incumbent and the entrant earn positive profits in competition after entry, it is more likely that the entrant can earn a sufficient margin above operating expenses to recover the sunk costs of entry. Other factors that lessen price wars are customer switching costs, customer brand loyalty, different convenience features, and imperfect information. If these factors are present, the

entrant can expect a reduction in the severity of post-entry competition, allowing for the recovery of sunk costs. Therefore, with product differentiation and other factors, sunk costs are less likely to be a barrier to entry.

If the entrepreneur establishes a firm that will offer a differentiated product, the firm's value is greater and the entrepreneur has a better chance of recovering costs incurred in establishing the firm. An entrant could offer products that deliver sufficiently greater value to the customer than do the products of established companies. In return, the entrant will earn margins that allow for the recovery of sunk costs incurred in entering the market.

Generally, with technological change, the need to sink cost is not an insurmountable barrier to the entry of new competitors. If an entrant employs new technologies to reduce its operating costs, it can enjoy a cost advantage over an incumbent operating outdated technology. Even if the incumbent and entrant compete on price, an entrant with an operating cost advantage over the incumbent will earn positive margins that allow for the recovery of sunk costs.

Moreover, sunk costs need not be an entry barrier because the entrant's sunk cost is a matter of strategic choice. The entrepreneur makes various decisions about how much to spend on planning, marketing, R&D and so on. The choice of products, production processes and transaction methods impact the new firm's costs. The entrant can serve different sets of customers than the incumbent, thus changing the entrant's need for distribution facilities and marketing expenditures.

The entrepreneur can adopt different production or distribution technologies than incumbent firms, often drastically changing the mix of investment and operating costs.

For example, entrants into telecommunications employ wireless systems with lower sunk cost in facilities in comparison with incumbents that operate traditional wireline systems.

Even with similar products and technology, an entrepreneur can reduce the risk associated with making investment commitments in a variety of ways. The entrepreneur can lessen the risk of post-entry competition for forming contracts with customers before irreversible investments are made. The entrant can compete with the incumbent for customers before deciding to enter the market and then only incur entry costs if the customer contracts will generate sufficient revenues. The company can find out if their product will be successful before making substantial investments in facilities. For example, aircraft manufacturers such as Boeing and Airbus sign up prospective customers on a contingent basis before starting a production run on an aircraft.

The success of the contracting strategy also depends on the level of transaction costs. Efficiencies in contracting can mitigate the impact of entry costs and entrepreneurs can use contracts as an entry strategy when there are substantial costs to establish the firm. If the transaction costs of contacting with customers are relatively low in comparison with sunk costs of entry, then testing the waters through contracts is worthwhile. The entrepreneur can use contracts to establish prices and customer orders before the established firm operates in the market thus reducing the risk of irreversible investments and avoiding price wars after entry.

5.2 Transaction Costs

The entrepreneur enters the market if it offers more efficient transactions than incumbents. A firm that performs transactions with greater efficiency than its competitors

has transaction advantage, see Spulber (2002, 2003). Also, the entrepreneur can enter the market with transactions that create new combinations of buyers and sellers, as Schumpeter (1997, p. 229) emphasized. Transaction advantages are likely to erode quickly limiting their potential effects as entry barriers. Entrepreneurs devise strategies to address the incumbent=s transaction advantage. They can create their own innovative transaction methods or they identify new combinations of buyers and sellers.

To surpass incumbent advantages, the entrepreneur must establish a firm that lowers transaction costs relative to incumbents or that offers transactions that create greater value for suppliers and customers. At the most basic level there may be economies of scale and scope in the transaction technology itself. Retail stores have fixed costs of transactions, that is, costs do not depend on the volume of transactions, such as information-processing equipment such as computers, cash registers, bar coding and point-of-sale terminals. These cost economies need not translate into barriers to entry. As with production cost advantages, the entrant can apply innovations in transaction technology to produce transactions at a lower costs. For example, an entrant could apply new types of enterprise software, point-of-sale equipment, or communications devices, as means of lowering transaction costs.

Transaction technologies such as back-office information technology or point-of-sale systems can involve substantial sunk costs. Entrants may perceive an entry barrier if incumbent firms may have made substantial irreversible investments in such transaction technology. However, sunk costs in transaction technology can be overcome by continued innovations. Moreover, entrants can pursue different distribution channels that lower transaction costs.

A critical transaction advantage for a firm stems from identifying innovations and bringing them to market faster than competitors. However, incumbent firms that achieve success from such a strategy often build their business by producing products based on a particular generation of technology. The successful incumbent has an incentive to stick with a particular generation of technology to provide service to its installed base of customers. The incumbent may choose to incrementally improve its products since continually changing their basic technology would involve substantial investment and costs of adjustment. As a result, entrants can gain a transaction advantage by embracing later generations of technology.

An entrepreneur may believe that the incumbent firm has a transaction advantage resulting from supplier and customer relationships that are difficult to duplicate. Moreover, the established firm may have experience in coordinating its supplier and customer transactions. For entrants to overcome such advantages, it is necessary to offer different types of transactions that improve upon existing types of exchange. For example, Amazon.com was able to enter the retail book business by selling through the Internet even though established bookstores had long-standing relationships both with customers and with publishers.

If the entrepreneur establishes a firm with innovative transactions, the sunk costs of establishing the firm need not be a barrier to entry. Through innovative intermediation between buyers and sellers, the entrant can earn operating profits after entry. By reducing transaction costs, the entrant will earn returns that allow the entrepreneur to recover sunk costs. Accordingly, entrants can make investments in information technology,

communications systems, customer support, supplier connections, and back office processes, that are recovered through transaction advantages over incumbents.

5.3 Competition and Innovation

Entrepreneurs compete with established firms to be innovators. In particular, suppose that an inventor makes a discovery of a new production process, product design, or transaction method. How shall the discovery be introduced into the market? Entrepreneurs and established firms are alternative mechanisms for introducing the invention to the market. Both entrepreneurs and established firms can serve as intermediaries between the inventor and users of the invention.

The entrepreneur can start a new firm to commercialize the invention. Alternatively, an established firm can employ the invention to improve or replace its existing processes, products, or transaction methods. The key question is why would new firms be needed for innovation.

In many cases, a new firm is needed because no existing firm is available. The invention opens a completely new line of business that does not correspond to the activities of any established enterprise. Often, the new line of business while related to the activities of existing firms is sufficiently distinct that established firms lack the knowledge and resources to employ the invention. Also, it may be that the diversification required to employ the invention would distract the company's managers and employees from their existing activities thus overcoming any potential economies of scope.

A new firm may be needed for innovation if existing firms do not correctly judge the economic value of the invention. As is often the case in practice, the managers of

existing firms may underestimate the competitive threat posed by the invention. This management problem commonly is referred to a “management myopia.”¹¹ The managers of existing firms follow such a narrow definition of their market that they fail to identify technological changes that create products that are substitutes in demand. Thus, managers of fax machines do not see the value of e-mail since they believe that they are in the fax machine business rather than in the communication business. Similarly, managers may not understand the impact of technologies that create substitute production processes or improved transactions. For example, Levitt (1960) notes that neighborhood grocery store chains believed that supermarkets did not pose a competitive threat.

The entrepreneur’s incentive to adopt an invention may differ from that of the established firm. Arrow (1962) identified a displacement effect faced by a monopolist. The firm earning a profit operating a business evaluates an invention on the basis of its incremental contribution to profit, in contrast to a competitive industry that has a zero profit benchmark. This same analysis would apply to an entrepreneur who evaluates an invention *de novo* in contrast to a profitable incumbent.

The vast literature on R&D yields insights into entrepreneurial innovation. Entrepreneurs can compete with established firms through R&D. An entrepreneur that obtains an invention before an incumbent could establish a firm that displaces the existing firm. This can be analyzed using models of racing to invent in which the winner obtains an exclusive monopoly patent and enters the market, see Reinganum (1989) for a survey. Gans and Stern (2000) look at a race where there is only one winner but licensing and imitation are feasible, see also Salant (1984) and Katz and Shapiro (1987).

¹¹ The term comes from Theodore Levitt (1960) who wrote about “marketing myopia” in which managers do not understand the implications of inventions for their business.

In the literature on research tournaments, a sponsor designs the prize for the best innovation and contestants devote effort to producing inventions, see for example Taylor (1995) and Che and Gale (2003). The tournaments approach studies the design of incentives for inventive effort. The contestants in a tournament could be existing firms and entrepreneurs. Entrepreneurs could establish a firm by providing the best invention and supplying the sponsor of the tournament with the desired product.

These examples consider competitions with a single winner. However, even if inventions are scientifically unique, difficult to copy, or protected by patent, there are alternative inventions that are substitutes in demand. As Edmund Kitch (2000, p. 1730) cogently observes “patents that confer monopoly market power are rare.” Kitch discusses “elementary and persistent errors in the economic analysis of intellectual property” noting particularly the incorrect assertion that exclusivity in intellectual property confers an economic monopoly. In the same way, copyrighted works compete with each other, see Goldstein (1992) and Yoo (2004). The Justice Department recognizes the possibility of competition. The Antitrust Guidelines for Licensing of Intellectual Property state that “The Agencies will not presume that a patent, copyright, or trade secret necessarily confers market power upon its owner.”¹²

In short, the market for inventions can be competitive. Inventions with different scientific and engineering details and patent protections can offer comparable cost savings. These inventions yield process innovations that are substitutes in demand within such categories as machine tools, industrial robots, enterprise software, factory designs,

¹² See U.S. Dep’t of Justice & Fed. Trade Commission, Antitrust Guidelines for the Licensing of Intellectual Property §§ 2.0, 2.2 (1995), *reprinted in* 4 Trade Reg. Rep. (CCH) ¶ 13,132, at 20,734–35. This is quoted in Yoo (2004).

lasers, or chemical processes. Different inventions can be used to develop new products with competing features. These inventions yield product innovations that are substitutes in demand within such categories as appliances, electronic gadgets, automobiles, cameras, fabrics, or medicines.

The presence of competing inventors provides entrepreneurs with a means of competing with existing firms. By obtaining inventions in the market for ideas, entrepreneurs introduce innovations that compete with the existing products or the innovations of established firms. Shane (2001) finds that an invention is more likely to be commercialized by an entrepreneur than by an established firm the greater is the innovation's importance, impact and patent scope. Hellman and Puri (2000) show that venture capital financing favors innovators over initiators and tends to speed the time to market for new high-tech ventures.

James Anton and Dennis Yao (1995) look at entrepreneurs who are employees of firms, discover a significant invention, and then leave to start a new firm. The employee has three options: keep silent and leave to start a new firm, reveal the invention to the employer in hopes of a reward, or negotiate a reward with the employer before revealing the invention. Dealing with the employer also can result in a new firm in the form of a "spin-off." Here general inventions result in spin-offs while specific inventions lead to "startup-ups." Thomas Hellmann (2005) uses a multi-task incentives model and shows how the choice of organizational structure of new ventures (start-ups, spin-offs, and internal ventures) depends on corporate policies toward employee inventors and the allocation of intellectual property rights.

5.4 Incentives

Economists and management researchers contrast the incentives of entrepreneurs with those of managers. The profit of the entrepreneur is the discounted value of the firm when established minus the costs of establishing the firm. In contrast, the manager receives contractual incentives that are based on the measured performance of the firm. The entrepreneur acts to maximize his profit, while the manager often responds to incentives designed by the owners of the firm. Yoram Barzel (1987) argues that the entrepreneur takes the role of the residual claimant because his actions are more costly to monitor than those of other factors of production.

Gromb and Scharfstein (2005) consider a partial equilibrium model in which an investor owns two potential projects that depend on managerial ability. The projects must be completed one after the other. The manager must devote effort to improve the chances the first project will be successful. The outcome of the projects provides information about the manager's ability. They interpret the first project as that of an established firm, and they interpret outsourcing of the second project as an entrepreneurial firm. The distinction between existing and new firms has to do with different labor-market incentives for managers, with higher-ability managers preferring to become entrepreneurs.

The incentives of entrepreneurs and managers differ because their tasks differ. The entrepreneur is concerned with defining the new firm, which is by definition a market entrant. The manager who works for an established firm, takes into account the potential continuation of existing business. The entrepreneur is building an organization and works independently. In contrast, the manager of an established firm is part of an

existing hierarchy, often with bureaucratic inertia, risk aversion and inefficiencies that are observed in many large business organizations, see Carl Schramm (2006b).

6. Conclusion

Although entrepreneurs implement innovations that may disrupt existing prices and products, entrepreneurs play a pivotal role in economic equilibrium. Entrepreneurs are endogenous since a consumer's decision to become an entrepreneur reflecting the consumer's capabilities and the value provided by establishing a firm. As a result of the actions of entrepreneurs, firms are endogenous as well. Firms create markets and organizations, so that markets and organizations also are endogenous. As a result of firms creating and managing markets and organization, the economy produces equilibrium prices and transactions. Thus, the entrepreneur helps the economy to achieve equilibrium.

The concept of the foundational shift helps to explain the interconnections between the financial, labor and technology decisions of the startup enterprise and the consumption, human capital, and innovation decisions of the individual entrepreneur. The foundational shift has important implications for law and public policy. The novel implications have to do with the situation before the foundational shift occurs when there is an absence of separation between the objectives of the startup and those of the entrepreneur. The entrepreneur contributes to the financing of the startup enterprise and faces the risk of personal bankruptcy. The entrepreneur contributes effort and management to the startup enterprise which affects his labor market decisions, personal income, and tax liability. The entrepreneur contributes ideas to the startup enterprise and is concerned with the personal dimensions of intellectual property. The entrepreneur is a

party to contracts with venture capitalists and others who help form the startup enterprise. These interconnections also affect the individual's incentives in making the transition from entrepreneur to owner. The personal dimensions of the entrepreneur's economic relationships raise legal and public policy questions.

In type-I competition, entrepreneurs compete with each other to establish firms. Entrepreneurs are successful in competing with each other based on their personal characteristics, including preferences, wealth, capabilities, judgment, information, and discernment of opportunities. In type-II competition, entrepreneurs compete with direct exchange because the firms they establish create and manage markets and organizations. The market and organizational transactions of successful firms enhance the efficiency of transactions in comparison with direct exchange between consumers. In type-III competition, entrepreneurs compete with established firms, offering new capacity, technological innovations, more efficient transactions, and improved incentives for performance.

The entrepreneur's actions illuminate the main issue in the theory of the firm – why do firms exist? The entrepreneur chooses to establish a firm only if doing so creates sufficient economic value. The entrepreneur finds it worthwhile to incur the transaction costs of establishing a firm only if the value of the firm exceeds those costs. The entrepreneur establishes a firm when it adds value relative to competing alternatives offered by other entrepreneurs, direct exchange between consumers, and established firms. The economic analysis of the entrepreneur suggests the need to develop further understanding of how laws and public policy affects the economic contributions of the entrepreneur.

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